

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554

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MAY 25 1995

In the Matter of

Preparation for International  
Telecommunication Union World  
Radiocommunication Conferences

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)  
) IC Docket No. 94-31  
)  
)

To: The Commission

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RESPONSE OF THE AMERICAN RADIO RELAY LEAGUE, INCORPORATED  
TO JOINT SUPPLEMENTAL REPLY COMMENTS

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THE AMERICAN RADIO RELAY  
LEAGUE, INCORPORATED

Christopher D. Imlay  
Booth Freret & Imlay  
1233 20th Street, N. W.  
Suite 204  
Washington, D. C. 20036  
(202) 296-9100

May 25, 1995

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## SUMMARY

The American Radio Relay League, Incorporated (the League), the national association of amateur radio operators in the United States, submits its response to the pleading entitled "Joint Supplemental Reply Comments" filed on or about May 18, 1995 by eight entities professing to be representative of the interests of the Non-voice, Non-geostationary Mobile-Satellite Service (NVNG MSS). The joint supplemental reply comments were filed relative to the Second Notice of Inquiry (the Second Notice), FCC 95-36, 60 Fed. Reg. 8994, released January 31, 1995.

The effort by the joint parties to develop a new allocation plan for NVNG MSS is, given the timetable for adoption by the Commission of a final allocation plan for WRC-95, prejudicial and unfair to the incumbent users of the bands targeted by the joint parties. They have had adequate time to prepare and submit a specific allocation plan in this proceeding; one which had been refereed by the various working groups on which the MSS proponents participated. They were not able to prepare an acceptable plan within that time, and instead, at the last minute, merely chose some frequency bands and proposed them without substantial justification at all. They submitted this plan only after the time when the plan could be subject to review by incumbents. The pleading contains new material, and should be either dismissed or the issue held over until a later competent WRC, so that a proper analysis of MSS allocations below 1000 MHz can be made.

As to the choice of 420-422 MHz, the Commission could not, on the basis of the compatibility information provided in the joint pleading, make any decision at all. Significant use is being made by amateur radio operators of the 420-422 MHz band for ATV operation and for fixed repeater links, and NVNG MSS operation is not compatible with this use. Nor can these repeaters be moved easily, due to the significant amateur operation higher in the 420-450 MHz band.

Therefore, the American Radio Relay League, Incorporated requests that the Commission not make any specific recommendations at WRC-95 with respect to the frequency allocation plan set forth in the joint pleading, and further that the 420-422 MHz band be omitted from any allocation plan which might be adopted for NVNG MSS.

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**RESPONSE OF THE AMERICAN RADIO RELAY LEAGUE, INCORPORATED  
TO JOINT SUPPLEMENTAL REPLY COMMENTS**

The American Radio Relay League, Incorporated (the League), the national association of amateur radio operators in the United States, by counsel, hereby respectfully submits its response to the pleading entitled "Joint Supplemental Reply Comments" (herein referred to as the "joint comments") filed on or about May 18, 1995<sup>1</sup> by eight entities (herein referred to as the "MSS proponents" or the "joint parties"), professing to be representative of the interests of the Non-voice, Non-geostationary Mobile-Satellite Service (NVNG MSS). The joint comments were filed relative to the Second Notice of Inquiry (the Second Notice), FCC 95-36, 60 Fed. Reg. 8994, released January 31, 1995.<sup>2</sup> The Second Notice

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<sup>1</sup> The pleading was not received by counsel for the League until May 22, 1995.

<sup>2</sup> The deadline for filing reply comments in this proceeding was extended by the Chief, International Bureau, by Order, DA 95-421, released March 6, 1995, to and including April 14, 1995.

addressed technical, regulatory and procedural matters related to the WRC-95 agenda and solicits information to assist the Commission in preparing United States proposals for future conference agendas. In response to the joint comments, the League states as follows:

#### **I. Procedural Issues**

1. The League is dismayed at the timetable utilized by the parties; they filed their "supplemental reply comments" May 18, 1995 in a proceeding in which reply comments were due on or before April 14, 1995. While this is an "open" proceeding, the MSS proponents have had a significant amount of time within which to firm up their proposals for MSS allocations for WRC-95. Now, at a time when the Commission is finalizing its position for WRC-95, and long after the comment date and the extended reply comment date, the MSS proponents have come up with an allocation proposal for MSS never before enunciated, and to which no other party in this proceeding, nor affected parties not heretofore involved, have had any procedural opportunity to respond. This, coupled with the extremely short time before the Commission must finalize its Report and Order in this proceeding, makes it appear as though the MSS proponents have unfairly filed their proposal late in this proceeding so as to make it impossible for others to submit any criticism to their inadequately supported allocation plan for NVNG MSS.<sup>3</sup>

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<sup>3</sup> In fact, it would appear that the MSS proponents had, by the time of the last IWG-2 meeting, no acceptable candidate MSS bands because inadequate studies had been done to establish any, and because of the inability of MSS proponents to establish an acceptable allocation plan with NTIA. Neither were any MSS

2. Notwithstanding the Commission's determination that this is an open docket, it would be manifestly unfair to adopt the allocation plan put forth in the Joint Supplemental Reply Comments, since the plan set forth therein is, in numerous respects, new material not heretofore propounded by the parties, or anyone else, in this proceeding.<sup>4</sup> It is hornbook Commission law that new matter may not be raised for the first time in a reply pleading, as it is clearly inequitable to deprive interested parties of the opportunity to respond to the substance of such new material. Oklahoma Press Publishing Company, 1 FCC 2d 952, 6 RR 2d 350 (1965); Industrial Business Corp., 26 RR 2d 1447 (Rev. Bd. 1973). Furthermore, the joint supplemental reply pleading is not even permitted by the Commission's Rules. According to Section 1.415(d) of the Rules, no additional comments, other than comments and

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allocations agreed upon by the time of the CPM-95 preparatory meeting. So, the real reason for this last-minute effort by the MSS proponents is that they were not prepared at the relevant time to go forward with an allocation plan. It would appear, therefore, that the only acceptable means of proceeding, since the Commission cannot responsibly advocate the instant plan without further notice and comment rule making, would be to defer consideration of MSS allocations at WRC-95 pending further study. The only reasonable means of proceeding is to complete necessary studies before making allocation decisions, rather than the other way around.

<sup>4</sup> There is no discussion of the 420-450 MHz band in the Second NOI anywhere, save for footnote 90, which discusses frequency separation between uplink and downlink channels, and asks whether an allocation in the 380-400 MHz range for one transmission direction with a companion allocation in the 420-450 MHz range should be considered. The NOI suggested that parties should identify any such possibilities. No one did during the comment or reply comment phase of this proceeding.

replies provided for in the Notice, may be filed unless specifically requested or authorized by the Commission. Section 1.430 of the Rules makes this provision applicable to Notices of Inquiry as well as Notices of Proposed Rule Making. The joint parties did not even request authority to file these late supplemental reply comments.

3. The parties attempt to pave the way for the impermissible filing by suggesting that "the parties" indicated in previous reply comments that there were ongoing efforts underway to identify the optimal frequency bands below 500 MHz for NVNG MSS use. That is indeed true; however, these earlier efforts were unsuccessful in that the allocation plans were not completed by the end of the IWG-2, TG 8/3 or CPM-95 meetings, and the product of their work at the time was not accepted by those groups. The MSS proponents could not even finish in time to have their recommendations in the IAC report. The result is that the instant allocation plan comes too late in the Notice of Inquiry cycle for WRC-95 to give incumbent licensees and others time to conduct technical studies. What the joint parties have done, therefore, is to place the burden of their inability to prepare a timely, workable allocation plan onto those radio services which would be disrupted severely by such allocations. These supplemental reply comments do not report on ongoing studies or work in process; rather, they identify, for the very first time, a wish list of specific bands already allocated to other services. They attempt to justify those allocations, scarcely before the Commission must determine its positions going into WRC-

95. The supplemental reply comments are a supplement to nothing. Rather, they consist of entirely new material, and newly claimed frequency bands. Any allocation change proposed by the MSS proponents requires significant further study, and the input of those radio services affected by the proposal in the joint pleading. To do otherwise would amount to an "allocate first, and study feasibility after the allocation is made" procedure, which is, a priori, a poor approach. Indeed, since the sharing studies that would be required have not been performed in the United States, nor by the ITU-R study groups, the bands at issue, should be deferred until WRC-97.

4. Accordingly, the joint parties have no right at all to submit the supplemental pleading; the filing of the pleading is procedurally, fundamentally unfair and prejudicial to a number of government and non-government radio services which are allocated those bands; and for the Commission to consider the proposals substantively deprives those licensees in the bands included in the MSS "wish list" of any significant opportunity to rebut the erroneous and unsupported allegations and weak engineering support which permeates the joint pleading. The League urges that the joint pleading be dismissed immediately and not substantively considered by the Commission in finalizing its proposals for the 1995 World Radiocommunication Conference. If the parties seriously intend to advance the specific allocation proposals contained in the joint pleading, they should do so openly and candidly, and they should be willing to defer the proposals until after the requisite sharing



studies are performed, rather than attempting to make them at the last minute, and to persuade the Commission to adopt them without any significant justification.

## **II. The 420-422 MHz Band is Ill-Suited for NVNG MSS**

5. Aside from its terminal procedural infirmities, the joint pleading fails utterly to justify most of the frequency allocations it seeks for NVNG MSS. The parties are apparently relying on the nature of MSS systems and protocols as a means of avoiding inter-service, co-channel interference. However, the joint pleading fails to address the interaction between MSS uplinks, for example, and the specific uses of other radio services already in the candidate bands. The analysis of other uses of the bands is woefully incomplete; indeed, with respect to the 420-422 MHz band, there is no engineering analysis at all, and it is impossible, on the face of the pleading, to determine or predict the extent of interaction between NVNG MSS and incumbent users, under the joint parties' proposal.

6. For its Service Uplink proposals, the joint parties suggest, inter alia, the allocation of two megahertz at 420-422 MHz. Of this, the sum total of the interference analysis offered by the joint parties is as follows:

...Second, this band contains some intermittent mobile users with which NVNG MSS FDMA systems can share successfully. Third, while this band contains radios for drones, it is believed that drone radios operate on an intermittent basis allowing for successful sharing. Finally, the 420-423 MHz band is currently being considered by Canada as an uplink band for the NVNG MSS. (footnote omitted).

The 420-430 MHz band is allocated nationally on a primary basis to government fixed and mobile radiolocation systems (see Footnote G2) and remote operation of drones at various test ranges. Non-government users include the amateur service on a secondary basis and the land mobile service in limited locations, i.e. 50 mile radius of Detroit, Cleveland and Buffalo.

Within the 420-430 MHz band, there were about 217 Government Master Frequency ("GMF") assignments as of September 1991 distributed among various agencies including the Air Force, Army, Coast Guard, Department of Energy, NASA and Navy. (footnote omitted). Of these, 62 assignments are radiolocation with the remaining for various fixed and mobile services. The distribution of GMF assignments with geographical coordinates in this band is contained in Figure 1. The majority of the assignments (62) are for low power remote control (telecommand) of drones. Although there is insufficient information on the exact location of frequencies used by any of the systems in the band, it is believed that NVNG MSS systems can share with drones.

Joint Supplemental Reply Comments, at 12-13.

No further mention is made in the pleading of the use of the band by the Amateur Service, or by the land mobile services above Line A. The engineering exhibit attached to the joint pleading is silent with respect to the 420-422 MHz band, or incumbent users. There is thus absolutely no indication as to the possibilities of sharing as between NVNG MSS uplinks on the one hand and amateur or land mobile uses on the other, and no serious effort at establishing compatibility between NVNG MSS and government uses in the band.

7. The Amateur Service makes significant use of the 420-422 MHz segment, and it is believed that any MSS use of the band will seriously disrupt amateur television, and amateur television repeater operation in that segment. The League's current Repeater Directory database includes 72 fixed Amateur Television (ATV) repeaters operating with inputs at 421.250 MHz, and outputs higher

in the 420-450 MHz band. Such repeaters are in place and operating in Illinois, Arizona, Florida, New York, Alabama, Alaska, Arkansas, Colorado, Delaware, Georgia, Indiana, Iowa, Kansas, Kentucky, Louisiana, Minnesota, Missouri, Nebraska, North Carolina, North Dakota, Ohio, Pennsylvania, Puerto Rico, South Carolina, Tennessee, Texas, Wisconsin and Utah (see **Exhibit A**, attached). These are only the published ATV repeaters, and the list is not exhaustive. In addition to television repeaters, and the various amateur stations that use them,<sup>5</sup> there are fixed links to control and link other types of repeaters in the 420-450 MHz band and in other bands. These are normally not publicly listed by the control operators of the repeaters.

8. It is apparent that the choice of 420-422 MHz for MSS service uplinks would be seriously disruptive of existing amateur television repeater facilities, which are constructed at great personal expense by radio amateurs and which are deployed routinely in emergency and public service activities. Most recently, amateur television facilities have been used by amateur volunteers in fire control and spotting activities in Northern California. Amateurs have also assisted law enforcement and public safety personnel with these systems in metropolitan areas.

9. Furthermore, to the extent that any reallocation of the 420-422 MHz band would force amateur television repeater systems to relocate in higher segments of the 420-450 MHz band (the upper

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<sup>5</sup> It is estimated conservatively that twenty users per ATV repeater are active at a given time period.

portions of which are significantly loaded with amateur narrowband, satellite and voice repeater operation) there would be an insufficient frequency separation between the input and output channels of the ATV repeaters. Therefore, any reallocation of the 420-422 MHz band would have the effect of forcing ATV repeaters off the air entirely.

10. These considerations, and the complete failure of the joint parties to even attempt to justify the allocation in terms of sharing possibilities, makes the 420-422 MHz band a uniquely poor choice for NVNG MSS. There is, from the perspective of the MSS users, no unique suitability of this segment, as opposed to any other segment in the vicinity of 410-420 MHz, for MSS uplink spectrum. Footnote 21 of the joint comments states that "the parties have also identified the 416-418 MHz band as an alternative for uplink spectrum. The 410-420 MHz band is allocated for government non-military fixed and mobile use. The parties...are willing to consider any frequencies within that range that may be deemed more suitable for sharing by NTIA." Therefore, from the point of view of the MSS users, other segments below 420 MHz would be sufficient for NVNG MSS uplink spectrum. The joint comments do not assess adequately alternatives to the proposed allocations, and that requires further study as well.

### **III. Conclusions**

11. This eleventh-hour effort by the joint parties to develop a new allocation plan for NVNG MSS is, given the timetable for adoption by the Commission of a final allocation plan for WRC-95,

highly prejudicial and unfair to the incumbent users of the bands targeted by the joint parties. They have had plenty of time to prepare and submit a specific allocation plan in this proceeding that was refereed by the various working groups on which they participated. They were not able to prepare an acceptable plan within that time, and instead at the last minute merely chose some frequency bands and proposed them without any justification at all. They submitted this plan only after the time when the plan could be subject to review by incumbents. The pleading contains new material, and should be either dismissed or the issue held over until a later competent WRC, so that a proper analysis of MSS allocations below 1000 MHz can be made. As to the choice of 420-422 MHz, the Commission could not, on the basis of the compatibility information provided in the joint pleading, make any decision at all. The foregoing illustrates that significant use is being made by amateur radio operators of the 420-422 MHz band for ATV operation and for fixed repeater links, and NVNG MSS operation is not compatible with this use. Nor can these repeaters be moved easily, due to the significant amateur operation higher in the 420-450 MHz band.

Therefore, the foregoing considered, the American Radio Relay League, Incorporated respectfully requests that the Commission not make any specific recommendations at WRC-95 on the frequency allocation plan set forth in the joint pleading, and further that

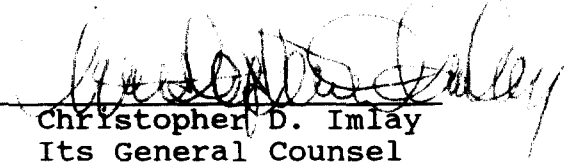
the 420-422 MHz band be omitted from any allocation plan which might be adopted for NVNG MSS.

Respectfully submitted,

**THE AMERICAN RADIO RELAY  
LEAGUE, INCORPORATED**

225 Main Street  
Newington, CT 06111

By

  
Christopher D. Imlay  
Its General Counsel

BOOTH, FRERET & IMLAY  
1233 20th Street, N.W.  
Suite 204  
Washington, D.C. 20036  
(202) 296-9100

May 25, 1995

## EXHIBIT A

# **Partial Listing of Amateur Television Repeaters in the Band 420-422 MHz**

## ILLINOIS

|             |         |         |       |         |        |
|-------------|---------|---------|-------|---------|--------|
| DECATUR     |         |         |       |         |        |
| Decatur     | 421.250 | 439.250 | KD9D  | o       | CIATVU |
| NORTHEAST   |         |         |       |         |        |
| Des Plaines | 421.250 | 439.250 | KB9FO | oe15734 | KB9FO  |

440

## ARIZONA

|               |         |         |      |  |      |
|---------------|---------|---------|------|--|------|
| PHOENIX METRO |         |         |      |  |      |
| Shaw Butte    | 421.250 | 434.000 | KS8J |  | AATV |

## FLORIDA

|              |         |         |       |                  |        |
|--------------|---------|---------|-------|------------------|--------|
| EAST CENTRAL |         |         |       |                  |        |
| Cocoa        | 421.250 | 434.000 | K4ATV | BBS, NASA Select | LISATS |

## NEW YORK

|              |         |   |        |     |      |
|--------------|---------|---|--------|-----|------|
| EAST CENTRAL |         |   |        |     |      |
| Cobleskill   | 421.275 | + | WA2ZWM | oal | SARC |

500

## ALABAMA

|                    |         |         |        |    |         |
|--------------------|---------|---------|--------|----|---------|
| Gadsden/Hensley Mt | 421.250 | 439.250 | WD4FEQ | oe | WD4FEQ  |
| Huntsville         | 421.250 | 439.250 | K4BFT  |    | HARC    |
| Muscle Shoals      | 421.250 | 439.250 | W4JNB  |    | MSARC   |
| Selma              | 421.250 | 439.250 | K14SC  | o  | S-D ARC |
| Webb               | 421.250 | 439.250 | N4RNO  | wx | HC EMA  |

## ALASKA

|           |         |         |        |       |        |
|-----------|---------|---------|--------|-------|--------|
| INTERIOR  |         |         |        |       |        |
| Fairbanks | 421.250 | 439.250 | KL7GNG | o ATV | KL7GNG |

## ARKANSAS

|               |         |         |       |   |       |
|---------------|---------|---------|-------|---|-------|
| LITTLE ROCK   |         |         |       |   |       |
| Little Rock   | 421.250 | 439.250 | N5NQW | o | N5NQW |
| NORTH CENTRAL |         |         |       |   |       |
| Harrison      | 421.250 | 439.250 | K5YWL | o | K5YWL |

## COLORADO

|                  |         |          |        |      |           |
|------------------|---------|----------|--------|------|-----------|
| BOULDER          |         |          |        |      |           |
| Boulder          | 421.250 | 1277.250 | WA0NHD | oATV | BCARES    |
| COLORADO SPRINGS |         |          |        |      |           |
| Colorado Spr     | 421.250 | 911.250  | WA0YWV | oATV | RamprthVN |

## DELAWARE

|            |         |         |       |            |       |
|------------|---------|---------|-------|------------|-------|
| WILMINGTON |         |         |       |            |       |
| Wilmington | 421.250 | 439.250 | KC3AM | ol Hor Pol | KC3AM |



# FLORIDA

|                                    |         |          |        |              |          |
|------------------------------------|---------|----------|--------|--------------|----------|
| CENTRAL<br>Orlando                 | 421.250 | 434.000  | K04QJ  | atv          | K04QJ    |
| NORTH CENTRAL<br>Ocala             | 421.250 | 434.000  | K3AAF  | atvoel       | SSRC     |
| NORTHEAST<br>Jacksonville          | 421.250 | 434.000  | N4KWC  | TSC AT VIDEO | CATS     |
| NORTHEAST CENTRAL<br>Daytona Beach | 421.250 | 434.000  | K4BV   | atv          | DBchARA  |
| SOUTH<br>Miami                     | 421.250 | 434.000  | KB4YXT | ATV NTSC olx | KA4ZAY   |
| WEST CENTRAL<br>Citrus Springs     | 421.250 | 434.000  | WA4PEQ | oATVr        | Sky High |
| ARC<br>Largo                       | 421.250 | 923.250  | AJ1R   | oATV         | AJ1R     |
| Largo                              | 421.250 | 1277.250 | AJ1R   | oATV         | AJ1R     |
| Largo                              | 421.250 | 434.000  | AJ1R   | oATV         | AJ1R     |

# GEORGIA

|               |         |          |        |   |         |
|---------------|---------|----------|--------|---|---------|
| Atlanta/Bell# | 421.250 | 434.000  | W4ZTL  | o | MATPARC |
| Brnswk/Jekyll | 421.250 | 439.250  | KB4PXX | o | KB4PXX  |
| Dalton ATV#   | 421.250 | 1265.000 | N4BZJ  | o |         |
| Savannah      | 421.250 | 434.000  | KK4TO  | o | CARS    |

# INDIANA

|           |         |          |       |                |           |
|-----------|---------|----------|-------|----------------|-----------|
| Anderson# | 421.250 | 923.250  | N9DEZ | atv sync 15734 | N9DEZ     |
| Anderson# | 421.250 | 1277.250 | N9DEZ | atv sync 15734 | N9DEZ     |
| LaPorte   | 421.250 | 439.250  | K9JSI | oe             | LaPorteAR |

# IOWA

|                        |         |         |        |             |            |
|------------------------|---------|---------|--------|-------------|------------|
| DAVENPORT<br>Davenport | 421.250 | 439.250 | W80BIZ | video xWx   | QCATVC     |
| Davenport              | 421.250 | 910.250 | W80BIZ | video       | QCATVC     |
| DUBUQUE<br>Dubuque     | 421.250 | 439.250 | KA0JAW | HzSync e CD | SPEC-COM   |
| NORTHWEST<br>West Bend | 421.250 | 439.250 | N0QQT  | video e     | VidSvcsLtd |

# KANSAS

|                          |         |         |       |   |             |
|--------------------------|---------|---------|-------|---|-------------|
| SOUTH CENTRAL<br>Wichita | 421.250 | 439.250 | K00CY | o | ICUC-UHF-TV |
|--------------------------|---------|---------|-------|---|-------------|

# KENTUCKY

|               |         |         |       |   |               |
|---------------|---------|---------|-------|---|---------------|
| Elizabethtown | 421.250 | 439.250 | W4BEJ | o | LINCOLN TRAIL |
|---------------|---------|---------|-------|---|---------------|

# LOUISIANA

|                            |         |         |        |           |           |
|----------------------------|---------|---------|--------|-----------|-----------|
| BATON ROUGE<br>Baton Rouge | 421.250 | 439.250 | W85JLZ | o ATV     | BRATS     |
| NEW ORLEANS<br>New Orleans | 421.250 | 439.250 | W00GIV | o ATV     | W00GIV    |
| SHREVEPORT<br>Shreveport   | 421.250 | 439.250 | W85NLF | oelWx ATV | NW LA ATV |

# MINNESOTA

|                          |         |         |       |                    |          |
|--------------------------|---------|---------|-------|--------------------|----------|
| MPLS-ST.PAUL<br>Mpls/ATV | 421.250 | 439.250 | K80GL | atv l 910.25 input | MPLSFSTV |
| Mpls/ATV                 | 421.250 | 910.250 | K80GL | atv                | MPLSFSTV |

# MISSOURI

## COLUMBIA/JEFFERSON

|           |         |         |        |    |           |
|-----------|---------|---------|--------|----|-----------|
| Columbia  | 421.250 | 434.000 | WDODVG | or | CenMOFSen |
| SOUTHWEST |         |         |        |    |           |
| Joplin    | 421.250 | 439.250 | WOTQR  | o  | WOTQR     |
| ST LOUIS  |         |         |        |    |           |
| St Louis  | 421.250 | 923.250 | KDOLLO |    | KDOLLO    |

# NEBRASKA

## OMAHA

|       |         |         |        |          |      |
|-------|---------|---------|--------|----------|------|
| Omaha | 421.250 | 434.000 | WBOCMC | o syncxz | WOWT |
|-------|---------|---------|--------|----------|------|

# NEW YORK

## ELMIRA/ITHACA

|        |         |         |      |     |       |
|--------|---------|---------|------|-----|-------|
| Ithaca | 421.250 | 439.250 | AF2A | ATV | TCARC |
|--------|---------|---------|------|-----|-------|

# NORTH CAROLINA

|             |         |         |       |   |            |
|-------------|---------|---------|-------|---|------------|
| Charlotte   | 421.250 | 439.250 | W4PPN | o | W4PPN/W1RP |
| Greensboro# | 421.250 | 434.000 | KO4AT | o | K4AZA      |

# NORTH DAKOTA

## SOUTHEAST

|         |         |         |       |     |       |
|---------|---------|---------|-------|-----|-------|
| Harwood | 421.250 | 439.250 | NONNR | atv | NONRR |
|---------|---------|---------|-------|-----|-------|

# OHIO

## ALLEN

|      |         |         |        |            |           |
|------|---------|---------|--------|------------|-----------|
| Lima | 421.250 | 439.250 | WB8ULC | oATV VIDEO | NWOhioARC |
|------|---------|---------|--------|------------|-----------|

## GREENE

|       |         |         |        |        |        |
|-------|---------|---------|--------|--------|--------|
| Xenia | 421.250 | 434.000 | KB8GRJ | AM ATV | KB8GRJ |
|-------|---------|---------|--------|--------|--------|

# PENNSYLVANIA

## LYCOMING

|              |         |         |       |     |       |
|--------------|---------|---------|-------|-----|-------|
| Williamsport | 421.250 | 439.250 | K3QFW | ATV | K3QFW |
|--------------|---------|---------|-------|-----|-------|

## PHILADELPHIA

|               |         |         |       |     |      |
|---------------|---------|---------|-------|-----|------|
| Phila/Ch Hill | 421.250 | 439.250 | W3PHL | ATV | PARA |
|---------------|---------|---------|-------|-----|------|

## PITTSBURGH

|               |         |         |        |   |      |
|---------------|---------|---------|--------|---|------|
| Pgh/Hazelwood | 421.250 | 910.250 | WA3PBD | o | GFMA |
|---------------|---------|---------|--------|---|------|

## SOUTHWEST

|      |         |         |       |   |        |
|------|---------|---------|-------|---|--------|
| Acme | 421.250 | 439.250 | W3PVH | o | LHVHFS |
|------|---------|---------|-------|---|--------|

# PUERTO RICO

## EAST

|         |         |  |        |           |  |
|---------|---------|--|--------|-----------|--|
| Humacao | 421.250 |  | KP4DGW | o ATV (e) |  |
|---------|---------|--|--------|-----------|--|

# SOUTH CAROLINA

|           |         |         |       |   |       |
|-----------|---------|---------|-------|---|-------|
| Lexington | 421.250 | 439.250 | N4GUP | o | N4GUP |
|-----------|---------|---------|-------|---|-------|

# TENNESSEE

|           |         |         |        |   |  |
|-----------|---------|---------|--------|---|--|
| Knoxville | 421.250 | 439.250 | WA4CDM | o |  |
|-----------|---------|---------|--------|---|--|

|           |         |         |       |   |  |
|-----------|---------|---------|-------|---|--|
| Nashville | 421.250 | 439.250 | KJ4ZQ | o |  |
|-----------|---------|---------|-------|---|--|

|         |         |         |        |   |  |
|---------|---------|---------|--------|---|--|
| Pulaski | 421.250 | 439.250 | KB4TPI | o |  |
|---------|---------|---------|--------|---|--|

# TEXAS

|         |         |         |       |     |       |
|---------|---------|---------|-------|-----|-------|
| Abilene | 421.250 | 439.250 | W5VRE | ATV | KCARC |
|---------|---------|---------|-------|-----|-------|

|        |         |          |       |     |       |
|--------|---------|----------|-------|-----|-------|
| Austin | 421.250 | 1253.250 | W5VDS | ATV | AATVC |
|--------|---------|----------|-------|-----|-------|

|          |         |         |      |     |  |
|----------|---------|---------|------|-----|--|
| Beaumont | 421.250 | 439.250 | KE5O | ATV |  |
|----------|---------|---------|------|-----|--|

|            |         |          |       |     |      |
|------------|---------|----------|-------|-----|------|
| Cedar Hill | 421.250 | 1277.250 | KC5NQ | ATV | NTSC |
|------------|---------|----------|-------|-----|------|

|      |         |         |       |     |  |
|------|---------|---------|-------|-----|--|
| Elmo | 421.250 | 439.250 | W5EEY | ATV |  |
|------|---------|---------|-------|-----|--|

|       |         |         |       |     |  |
|-------|---------|---------|-------|-----|--|
| Tyler | 421.250 | 434.000 | W5KPZ | ATV |  |
|-------|---------|---------|-------|-----|--|

WISCONSIN

NORTH CENTRAL

|        |         |          |      |                   |       |
|--------|---------|----------|------|-------------------|-------|
| Wausau | 421.250 | 434.000  | AD9W | o e l aural + 4.5 | RMATS |
| Wausau | 421.250 | 923.250  | AD9W | oel vidfm aud+4.5 | RMATS |
| Wausau | 421.250 | 1250.000 | AD9W | oel vidfm aud+4.5 | RMATS |

2000

UTAH

#STATEWIDE

|            |         |  |  |                     |      |
|------------|---------|--|--|---------------------|------|
| #Statewide | 421.500 |  |  | pk node intertie 96 | UPRA |
|------------|---------|--|--|---------------------|------|

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Washington, D. C. 20554

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\*Thomas S. Tycz, Division Chief  
International Bureau  
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2000 M Street, N. W., Room 811  
Washington, D. C. 20554

\*Cecily C. Holiday, Deputy Division Chief  
International Bureau  
Federal Communications Commission  
2000 M Street, N. W., Room 520  
Washington, D. C. 20554

\*Fern J. Jarmulnek, Branch Chief  
International Bureau  
Federal Communications Commission  
2000 M Street, N. W., Room 518  
Washington, D. C. 20554

\*Kristi Kendall, Esq.  
International Bureau  
Federal Communications Commission  
2000 M Street, N. W., Room 517  
Washington, D. C. 20554

\*Harold Ng, Branch Chief  
International Bureau  
Federal Communications Commission  
2000 M Street, N. W., Room 512  
Washington, D. C. 20554

\*William Luther, Branch Chief  
Radiocommunication Policy Branch  
International Bureau  
Federal Communications Commission  
2000 M Street, N. W., Room 804  
Washington, D. C. 20554

\*Damon C. Ladson  
International Bureau  
Federal Communications Commission  
2000 M Street, N. W., Room 803  
Washington, D. C. 20554

\*Al Schneider  
Federal Communications Commission  
1919 M Street, N. W., Room 408  
Washington, D. C. 20554

\*Steven Selwyn  
Federal Communications Commission  
2000 M Street, N. W., Room 869  
Washington, D. C. 20554

\*Ronald Netro  
Wireless Telecommunications Bureau  
Federal Communications Commission  
2025 M Street, N. W., Room 5002  
Washington, D. C. 20554

Richard D. Parlow  
Office of Spectrum  
National Telecommunications &  
Information Administration  
Department of Commerce  
14th Street & Constitution Avenue, N. W.  
Room 4099  
Washington, D. C. 20230

William D. Gamble  
Deputy Associate Administrator  
National Telecommunications &  
Information Administration  
Department of Commerce  
14th Street & Constitution Avenue, N.W.  
Room 4099  
Washington, D. C. 20230

Warren Richards  
U. S. Department of State  
2201 C Street, N. W.  
Washington, D. C. 20520

Carolyn Darr  
Associate Administrator  
Office of International Affairs/NTIA  
U. S. Department of Commerce  
Room 4720  
14th & Constitution Avenue, N. W.  
Washington, D. C. 20230

Thomas Keller  
Verner, Liipfert Bernhard  
McPherson & Hand  
901 15th Street, N. W., Suite 700  
Washington, D. C. 20005

Carl R. Frank  
Wiley Rein & Fielding  
1776 K Street, N. W.  
Washington, D. C. 20006

William K. Keane  
Winston & Strawn  
1400 L Street, N. W.  
Washington, D. C. 20005

L. R. Raish  
Fletcher Heald & Hildreth  
1300 N. 17th Street, 11th Floor  
Rosslyn, VA 22209

Robert L. Hoggarth, Director  
Regulatory Relations, PCIA  
1501 Duke Street  
Alexandria, VA 22314-3450

Jeffrey Sheldon  
UTC  
1140 Connecticut Avenue, N. W.  
Suite 1140  
Washington, D. C. 20036

Jill Abeshouse Stern  
Shaw, Pittman, Potts & Trowbridge  
2300 N Street, N. W.  
Washington, D. C. 20037  
Counsel for CTA COMMERCIAL SYSTEMS, INC.

Leslie Taylor  
Leslie Taylor Associates  
6800 Carlynn Court  
Bethesda, MD 20817-4302  
Counsel for E-SAT, INC.

Ron Jarvis  
Catalano & Jarvis, P.C.  
1101 30th Street, N. W., Suite 300  
Washington, D. C. 20007  
Counsel for FINAL ANALYSIS COMMUNICATION  
SERVICES, INC.

Peter Rohrbach  
Hogan & Hartson  
Columbia Square Building  
555 - 13th Street, N. W.  
Washington, D. C. 20004-1109  
Counsel for GE AMERICAN COMMUNICATIONS,  
INC.

Robert Mazer  
Rosenman & Colin  
1300 19th Street, N. W., Suite 200  
Washington, D. C. 20036  
Counsel for LEO ONE USA CORPORATION

Stephen L. Goodman  
Halprin, Temple & Goodman  
Suite 650 East Tower  
1100 New York Avenue, N. W.  
Washington, D. C. 20005  
Counsel for ORBITAL COMMUNICATIONS  
CORPORATION

Raul R. Rodriguez  
Leventhal, Senter & Lerman  
2000 K Street, N. W., Suite 600  
Washington, D. C. 20006-1809  
Counsel for STARSYS GLOBAL POSITIONING,  
INC.

Henry Goldberg  
Joseph Godles  
Goldberg, Godles, Weiner & Wright  
1229 19th Street, N. W.  
Washington, D. C. 20036  
Counsel for VOLUNTEERS IN TECHNICAL  
ASSISTANCE

  
Margaret A. Ford

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